Comprehensive® VIDEO GROUP The Interface Place®

USER MANUAL

Models:

CVG-719xl, ***Presentation Switcher / Scaler***

CVG-720xl, ***Presentation Switcher / Scaler***

CVG-724xl, ***Presentation Switcher / Scaler***

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1 Introduction

Congratulations on purchasing your **CVG-719xl / CVG -720xl / CVG -724xl** *Presentation Switcher / Scaler*, which is ideal for the following typical applications:

- Projection systems in conference rooms, boardrooms, auditoriums, hotels and churches
- Production studios, rental and staging
- Any application where high quality conversion and switching of multiple and different video signals to graphical data signals is required for projection purposes

The package includes the following items:

- **CVG-719xl / CVG -720xl / CVG -724xl** *Presentation Switcher / Scaler*
- Power cord[1]
- Infra-red remote control transmitter
- Null-modem adapter
- This user manual

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual

3 Overview

The **CVG-719xl / CVG -720xl / CVG -724xl** is a *Presentation Switcher / Scaler* designed for a wide variety of presentation and multimedia applications. It is a true multi-standard video to RGBHV (pixel) scaler and a seamless presentation switcher. It converts video, s-Video, component video, VGA-through-UXGA and DVI signals to a range of user-selectable VESA and HDTV pixel rates, as well as some other special resolutions. Using the Presentation Switcher / Scaler, you can select any one of the inputs and scale that input to the output at the set resolution.

The Presentation Switchers / Scalers support the following user-selectable output pixel rates:

1 We recommend that you use only the power cord that is supplied with this machine

- VGA (640x480)
- SVGA (800x600)
- XGA (1024x768)
- SXGA (1280x1024)
- UXGA (1600x1200)
- 852x1024i
- 1024x1024i
- 1366x768
- 1365x1024
- 1280x720
- 720x483
- 852x480
- 1400x1050
- 1280x768*[1]
- User Define[2]

The **CVG -724xl** also has the following user selectable output pixel rates: 480p, 720p, 1080i and 1080p. Each Presentation Switcher / Scaler:

- Digitally reprocesses the signal to correct mastering errors, and regenerates the video at a higher line and pixel rate format, providing native-resolution video for LCD, DLP and plasma displays
- Up- and down-scales any graphics resolution to any other resolution[3]
- Incorporates a unique graphics-scaling engine with image enhancement algorithms, which are built into the firmware
- Is specifically designed to improve video quality by reducing chroma noise
- Scales and zooms (to up to 400% of the original size)
- Includes a built-in power amplifier of 2x5Watt RMS, ample to fill a presentation room. Audio volume can be easily and rapidly controlled via the front panel buttons
- Switches the audio channels in audio-follow-video mode
- Includes an OSD (On-Screen Display) – for making adjustments – that can be located anywhere on the screen, and can be doubled in size
  For example, the OSD can be used to deactivate the source prompt, choose the color of the blank screen, and choose from three seamless switching image transition speeds
- Includes seven[4] multi-functional INPUT SELECTOR buttons that can cycle between selecting a source, freezing that source, or deactivating that source (and displaying a blank screen), if programmed to do so[5]
- Includes a BLANK button, a MUTE button; a FREEZE button; a RESET TO VGA button (to hardware-reset the output resolution); and a PANEL LOCK button[6]

1 This is not a standard VESA resolution and its parameters vary from manufacturer to manufacturer. Therfore, use this resolution with caution. It is also possible to use the parameters of this resolution in combination with the User Defined resolution. There is also an RS-232 command for this resolution

2 Recommended for advanced users only – non-standard settings may not be recognized by the display device

3 For example, scaling a VGA input to an UXGA output, or an SXGA input to an SVGA output

4 Eight on the CVG-724xl

5 See section 8.5.9

6 Also includes a front panel lock that can be programmed via the OSD menu (see section 8.5.9)

- Has two HD15F outputs, that can be used as graphics, or HDTV[1] outputs
- Incorporates full ProcAmp[2] for video correction and enhancement
- Offers high quality de-interlacing 3:2/2:2 pulldown[3]
- Can provide non-linear scaling for 4:3, 16:9 transformation[4]
- Supports firmware upgrade via RS-232
- Includes non-volatile memory that retains the last setting, after switching the power off and then on again
- Includes a built-in Picture-in-Picture (PIP) inserter (not available on the **CVG-719xl**)

Control your Presentation Switcher / Scaler:

- From the front panel buttons
- Remotely from the infra-red remote control transmitter
- Remotely via RS-232

To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise- levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances and position your **CVG-719xl / CVG -720xl / CVG -724xl** away from moisture, excessive sunlight and dust

4 Your Presentation Switcher / Scaler

This section defines each of the Presentation Switcher / Scaler machines:

- Figure 1 and Figure 2 illustrate the **CVG-719xl** *Presentation Switcher / Scaler*
- Figure 3 and Figure 4 illustrate the **CVG-720xl** *Presentation Switcher / Scaler*
- Figure 5 and Figure 6 illustrate the **CVG-724xl** *Presentation Switcher / Scaler*

Table 1 and Table 2 define the *Presentation Switcher / Scaler* machines[5].

1 For CVG-724xl

2 Processing amplification enables adjustment of different video and audio signal parameters

3 Accommodates the frame-rate of a converted movie (24 frames per second) to video frequencies (25 frames per second (PAL); 30 frames per second (NTSC)

4 See section 8.4.1

5 Some items, which appear in the table, do not appear in the illustrations since they are not included in that specific machine

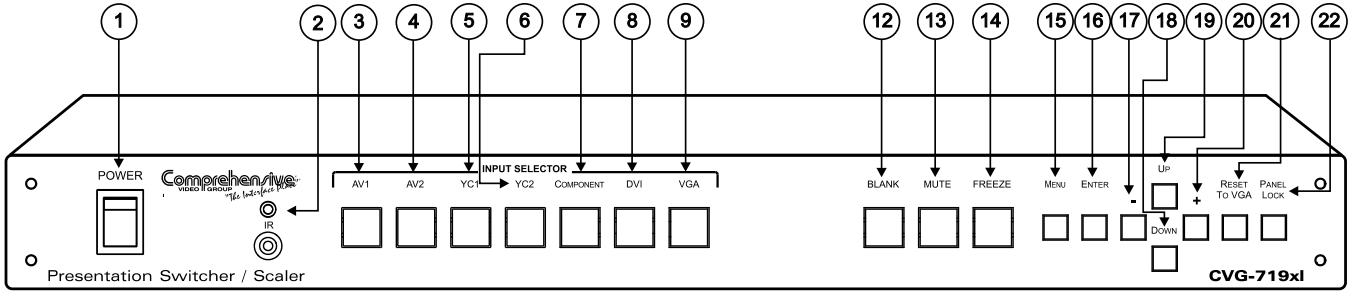


Figure 1: CVG-719xl Presentation Switcher / Scaler Front Panel[1]

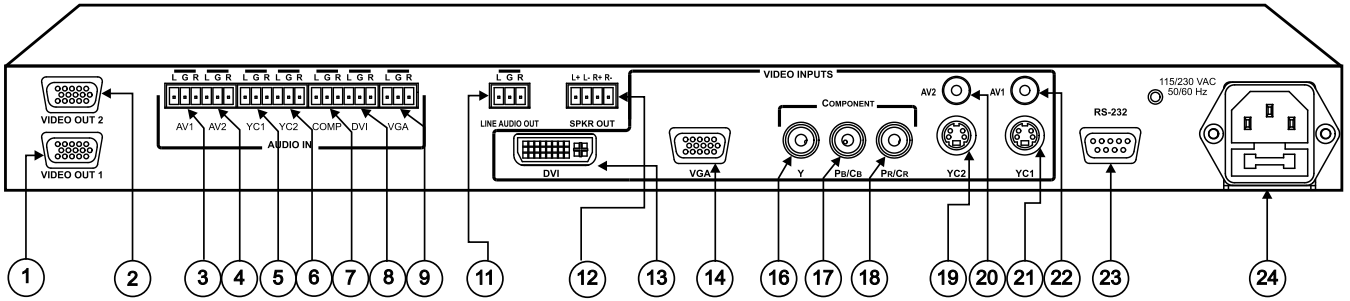


Figure 2 CVG-719xl Presentation Switcher / Scaler Rear Panel[2]

1 Items 10 and 11, which appear in Table 1 are not included in this machine

2 Items 10 and 15, which appear in Table 2 are not included in this machine

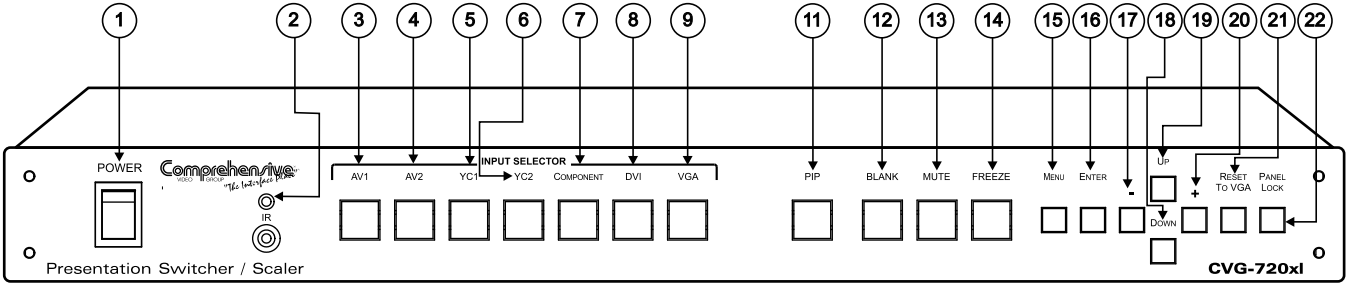


Figure 3: CVG-720xl Presentation Switcher / Scaler Front Panel[1]

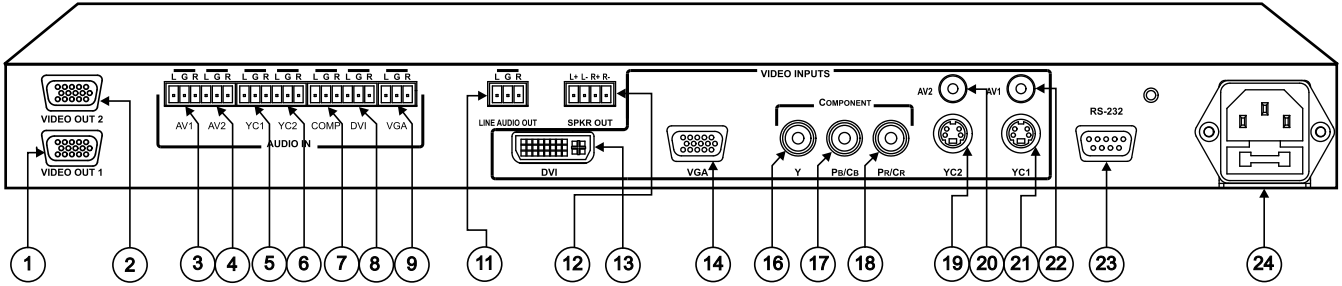


Figure 4: CVG-720xl Presentation Switcher / Scaler Rear Panel[2]

1 Item 10, which appears in Table 1 is not included in this machine

2 Items 10 and 15, which appear in Table 2 are not included in this machine

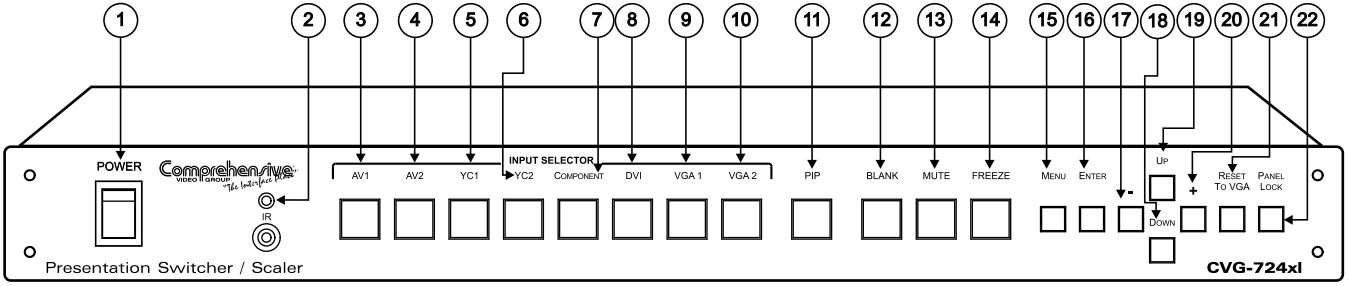


Figure 5: CVG-724xl Presentation Switcher / Scaler Front Panel

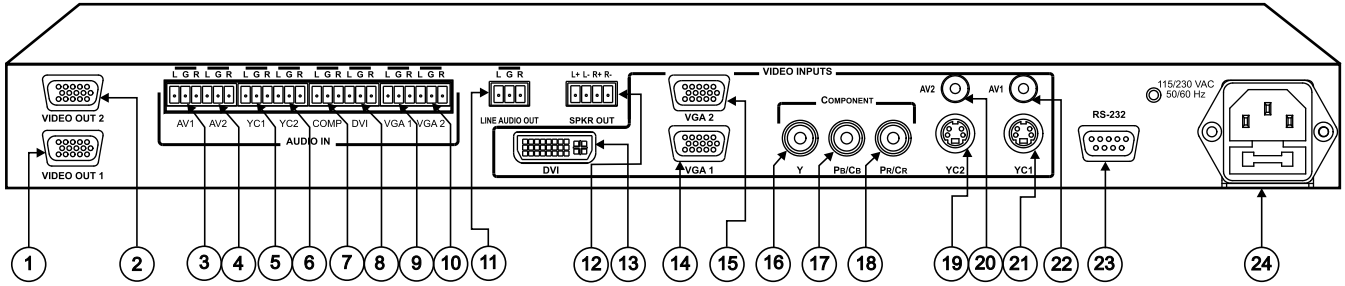


Figure 6: CVG-724xl Presentation Switcher / Scaler Rear Panel

Table 1: Front Panel Presentation Switcher / Scaler Features

#	Feature		Function
1	*POWER* Switch		Illuminated switch for turning the machine ON or OFF
2	*IR* Receiver / LED		Red when the unit accepts IR remote commands
3	*INPUT SELECTOR* Buttons[1]	*AV1*	Press to select the composite video/audio source 1
4		*AV2*	Press to select the composite video/audio source 2
5		*YC1*	Press to select the s-Video (Y/C)/audio source 1
6		*YC2*	Press to select the s-Video (Y/C)/audio source 2
7		*COMPONENT*	Press to select the component video/audio source
8		*DVI*	Press to select the DVI/audio source
9		*VGA*[2] *1*	Press to select the VGA/audio source 1
10		*VGA*[2] *2*	Press to select the VGA/audio source 2
11	*PIP* Button[3]		Toggles the picture-in-picture function (see section 7.2)
12	*BLANK* Button		Press to toggle between a blank screen (blue or black screen)[4] and the display
13	*MUTE* Button		Press to toggle between muting (blocking out the sound) and enabling the audio output
14	*FREEZE* Button		Press to freeze/unfreeze the output video image[4]
15	*MENU* Button		Displays the OSD menu screen[5]
16	*ENTER* Button		Moves to the next level in the OSD screen
17	- Button		Decreases the range by one step in the OSD screen[6]
18	*DOWN* Button		Moves down one step (in the same level) in the OSD screen[6]
19	*UP* Button		Moves up one step (in the same level) in the OSD screen[6]
20	+ Button		Increases the range by one step in the OSD screen[6]
21	*RESET TO VGA* Button		Press and hold for a few seconds[7] to reset to the default output resolution (640x480 @60Hz)
22	*PANEL LOCK* Button		Press and hold to lock/unlock the front panel to prevent unintentional operation

1 When selected, button illuminates. See section 7.1 for details of how to program the INPUT SELECTOR buttons

2 Only the CVG-724xl has two VGA INPUT SELECTOR buttons. The CVG-719xl and CVG-720xl have one VGA button

3 Not available on the CVG-719xl

4 Also available via each INPUT SELECTOR button, when programmed accordingly (see section 7.1)

5 Or moves to the previous level in the OSD screen

6 When pressing the button continuously, you can speed up its response. For step-by-step response, press and release the button as many times as needed

7 Until you see the screen refresh

Table 2: Rear Panel Presentation Switcher / Scaler Features

#	Feature			Function
1	*VIDEO OUT 1* HD15 Connector			Connects to the video acceptor (for example, a plasma display, projector or monitor) that displays the scaled output In the default HDTV mode, the signal goes out via 3 PINS: PIN 1 is P_r, PIN 2 is Y, PIN 3 is P_b
2	*VIDEO OUT 2* HD15 Connector			Connects to the video acceptor (for example, a plasma display, projector or monitor) that displays the scaled output In the default HDTV mode, the signal goes out via 3 PINS: PIN 1 is P_r, PIN 2 is Y, PIN 3 P_b
3	*AUDIO IN* Terminal Block Connectors	*AV1*		Connects to the stereo audio input from composite video source 1
4		*AV2*		Connects to the stereo audio input from composite video source 2
5		*YC1*		Connects to the stereo audio input from s-Video source 1
6		*YC2*		Connects to the stereo audio input from s-Video source 2
7		*COMP*		Connects to the stereo audio input from the component video source
8		*DVI*		Connects to the stereo audio input from the DVI graphics source
9		*VGA*[1] *1*		Connects to the stereo audio input from the VGA graphics source 1
10		*VGA*[1] *2*		Connects to the stereo audio input from the VGA graphics source 2
11	*LINE AUDIO OUT* Terminal Block Connector			Connects to the stereo audio acceptor
12	*SPKR OUT* Terminal Block Connector			Connects to the speakers
13	*VIDEO INPUTS*	*DVI* Connector		Connects to the DVI (digital video interface) graphics source
14		*VGA*[1] *1* HD15 Connector		Connects to the VGA (analog interface) graphics source 1. When connecting an HDTV source, the signal goes in via 3 PINS: PIN 1 is Y, PIN 2 is Pb, and PIN 3 is Pr
15		*VGA*[1] *2* HD15 Connector		Connects to the VGA (analog interface) graphics source 2. When connecting an HDTV source, the signal goes in via 3 PINS: PIN 1 is Y, PIN 2 is Pb, and PIN 3 is Pr
16		*COMPONENT*	*Y* RCA Connector	Connect to the component (Y, Pb/Cb, Pr/Cr) or RGB video source. If RGB colorspace is used, connect as follows: For video frequencies[2], connect: • Green to the Y connector • Blue to the Pb/Cb connector • Red to the Pr/Cr connector For Graphics frequencies[3], connect: • Red to the Y connector • Green to the Pb/Cb connector • Blue to the Pr/Cr connector
17			*Pb/Cb* RCA Connector	
18			*Pr/Cr* RCA Connector	
19		*YC2* 4p Connector		Connects to the s-Video source 2
20		*AV2* RCA Connector		Connects to the composite video source 2
21		*YC1* 4p Connector		Connects to the s-Video source 1
22		*AV1* RCA Connector		Connects to the composite video source 1
23	*RS-232* DB 9 Connector			Connects to PC or Serial Controller
24	Power Connector with *Fuse*			AC connector enabling power supply to the unit

1 Only the CVG-724xl has 2 VGA connectors. The CVG-719xl and CVG-720xl have 1 VGA connector

2 50Hz or 60Hz interlaced video

3 Including HD (480p, 576p, 720p and 1080i)

5 Installing on a Rack

This section describes what to do before installing on a rack and how to rack mount.

Before Installing on a Rack

Before installing on a rack, be sure that the environment is within the recommended range:	
Operating temperature range	+5 to +45 Deg. Centigrade
Operating humidity range	5 to 65% RHL, non-condensing
Storage temperature range	-20 to +70 Deg. Centigrade
Storage humidity range	5 to 95% RHL, non-condensing

CAUTION!!

When installing on a 19" rack, avoid hazards by taking care that:

1 It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.

2 Once rack mounted, enough air will still flow around the machine.

3 The machine is placed straight in the correct horizontal position.

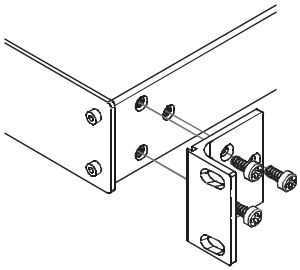
4 You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.

5 The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to supply connections other than direct connections to the branch circuit (for example, the use of power strips), and that you use only the power cord that is supplied with the machine.

How to Rack Mount

To rack-mount a machine:

1 Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



2 Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note that:

- **In some models, the front panel may feature built-in rack ears**
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power

6 Connecting your Presentation Switcher / Scaler

To connect the **CVG-724xl** as illustrated in the example[1] in Figure 7, do the following[2]:

1. Connect the following video sources[3]:
   - One[4] composite video source (for example, a composite video player) to the AV1 RCA connector
   - One[4] s-Video source (for example, an s-Video player) to the YC1 4p connector
   - A component video[5] source (for example, a Betacam video player) to the three RCA connectors, Y, P_b/C_b, and P_r/C_r[6]
   - One computer graphics source[7] to the VGA 1 HD15 connector
   - A DVI graphics source to the DVI connector
2. Connect the stereo audio sources[8] (not illustrated in Figure 7):
   - The audio of the composite video source 1 to the AUDIO IN AV1 terminal block connector
   - The audio of s-Video source 1 to the AUDIO IN YC1 terminal block connector
   - The audio of the component video source to the AUDIO IN COMP terminal block connector
   - The audio of computer graphics source to the AUDIO IN VGA1 terminal block connector
   - The audio of the DVI graphics source to the AUDIO IN DVI terminal block connector
3. Connect the VIDEO OUT 1 and VIDEO OUT 2 HD15F connectors[9] to the video acceptors, for example, a plasma display and a VGA display.

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1 From this section on, all the information is relevant to the CVG-719xl, CVG-720xl and CVG-724xl machines, unless noted otherwise

2 Switch OFF the power on each device before connecting it to your CVG-724xl. After connecting your CVG-724xl, switch on its power and then switch on the power on each device

3 You do not have to connect all the inputs

4 Although in the example illustrated in Figure 7 only one source is connected, you may connect both sources simultaneously

5 Sometimes called YUV, or Y, B-Y, R-Y, or Y, Pb, Pr

6 Alternatively, you can connect an RGB signal (not shown in Figure 7), as follows: Red to the Y connector, Green to the Pb/Cb connector, and Blue to the Pr/Cr connector

7 You can connect up to two graphic sources only on the CVG-724xl, other models in this series have only one VGA graphic source

8 As required. Not all devices need to be connected

9 In the HDTV mode, the signal goes out via three PINS: PIN 1 is Red or Pr, PIN 2 is Green or Y, PIN 3 is Blue or Pb

4. Connect the LINE AUDIO OUT terminal block connector to one of the audio acceptors, for example, speakers (not illustrated in Figure 7)
5. Connect the SPKR OUT terminal block to a pair of loud speakers.
6. The power cord[1] (the power connector is not illustrated in Figure 7).
7. A PC (optional), as section 6.2 describes.

6.1 The RGBS and RGsB PINOUTs

Table 3 defines both the progressive[2] and interlaced[3] RGBS and RGsB pinouts:

Table 3: RGBS and RGsB PINOUTS

Input	Color Space	PINOUT
VGA	RGsB	Green + sync, to PIN 1 Blue to PIN 2 Red to PIN 3
	RGBS	Red to PIN 1 Green to PIN 2 Blue to PIN 3 Hs (H and V) to PIN 13
YUV	RGsB	Green + sync to Y Blue to Pb Red to Pr

1 We recommend that you use only the power cord that is supplied with this machine

2 A display mode in which all the horizontal lines of an image are displayed in a single frame (one field)

3 A display mode in which a frame consists of two separate fields with the first field consisting of odd horizontal lines and the second field even horizontal lines

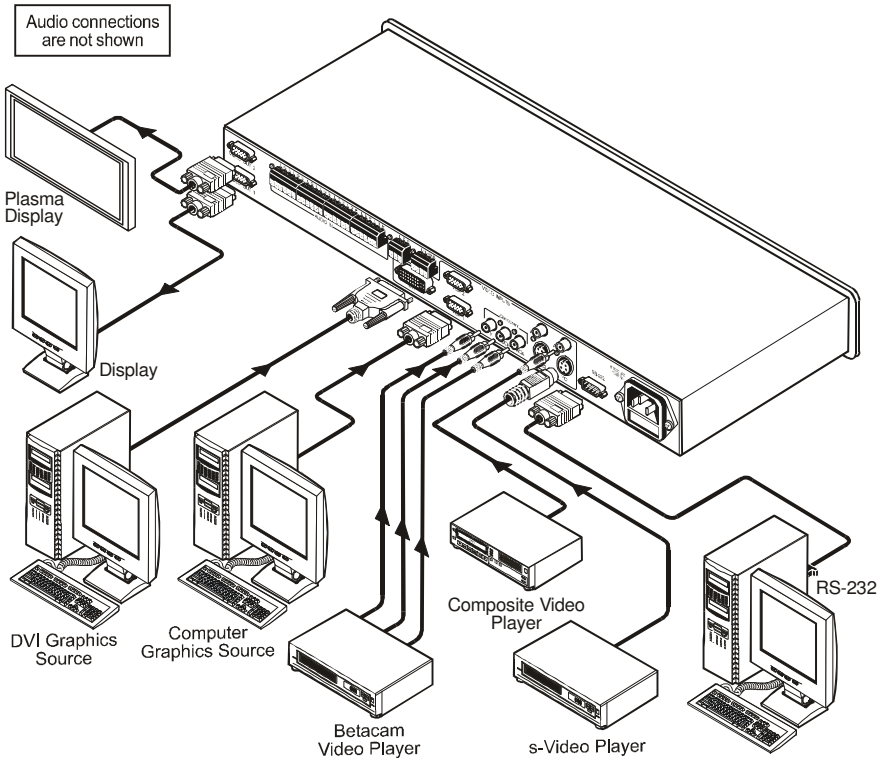

Figure 7: Connecting the CVG-724xl Rear Panel

6.2 Connecting a PC

You can connect a PC (or other controller) to the **CVG-724xl** via the RS-232 port for remote control, and for upgrading the firmware.

To connect a PC to a **CVG-724xl** unit, using the Null-modem adapter provided with the machine (recommended):

- Connect the RS-232 DB9 rear panel port on the **CVG-724xl** unit to the Null-modem adapter and connect the Null-modem adapter with a 9-wire flat cable to the RS-232 DB9 port on your PC

To connect a PC to a **CVG-724xl** unit, without using a Null-modem adapter:

- Connect the RS-232 DB9 port on your PC to the RS-232 DB9 rear panel port on the **CVG-724xl** unit, forming a cross-connection[1], as Figure 8 illustrates

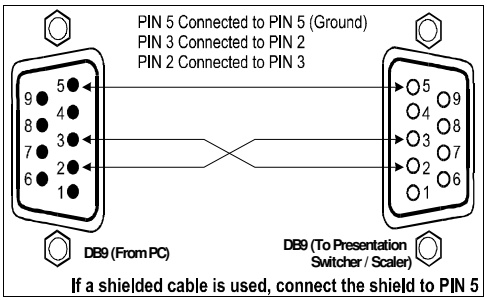
PIN 5 Connected to PIN 5 (Ground)
PIN 3 Connected to PIN 2
PIN 2 Connected to PIN 3
DB9 (From PC)
DB9 (To Presentation Switcher / Scaler)
If a shielded cable is used, connect the shield to PIN 5

Figure 8: Connecting the PC

1 Also known as a Null-modem connection

7 Presentation Switcher / Scaler Buttons

The **CVG-724xl** includes the following front panel buttons:

- Eight INPUT SELECTOR buttons[1], see section 7.1
- A PIP button[2], see section 7.2
- BLANK, MUTE and FREEZE buttons
- Six OSD buttons
- A RESET TO VGA button
- A PANEL LOCK button, see section 7.3

7.1 Switching an Input

Each INPUT SELECTOR button can be used to select the source. It can also be programmed to freeze the image or display a blank screen when pressed again. Refer to section 8.5.9 for details.

You can switch seamlessly[3] between each input[4] that is connected to a source, by pressing the appropriate INPUT SELECTOR button. The OSD status appears superimposed over the top right corner of the screen for a few seconds, as Figure 9 illustrates:

Figure 9: OSD Input Status

1 The CVG-719xl and CVG-720xl have seven INPUT SELECTOR buttons

2 Not available on the CVG-719xl

3 For glitchless transitions between inputs

4 To set the image transition speed (fast, safe or moderate), see section 8.5.5

7.2 The PIP Button Feature

The Picture-in-Picture inserter (PIP) is used to present video and graphic sources simultaneously. You can display:

- An inserted video source[1] PIP over a graphic source[2] display
- An inserted graphic source[2] PIP over a video source[1] display

7.2.1 Selecting the PIP Source

To use the PIP feature, set the PIP source via the OSD menu by using either the OSD front-panel buttons or the remote-transmitter keys.

To set the PIP source, do the following:

1. Select an input source[3].
2. Press the MENU button to enter the OSD menu.
3. Press the DOWN button to move to the Utility icon, and then press ENTER.
4. Scroll down to the PIP Setting icon and press ENTER.
5. Use the UP or DOWN buttons to select PIP Source, press ENTER and select a PIP source from the drop-down list box (see Table 4).
   The PIP source prompt appears on the display (see Figure 10).
6. To exit the OSD menu, press the MENU button several times, until the OSD disappears.

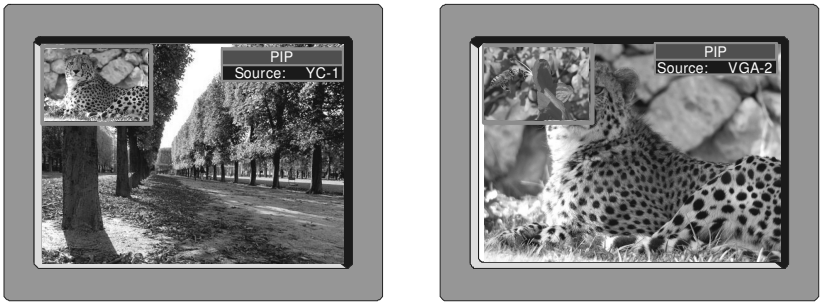

Figure 10: PIP Source

You can repeat the above procedure to change the current PIP source (compliant to Table 4)

1 That is, composite, s-Video or component

2 That is, DVI or VGA

3 Either a graphic source (for a video PIP source) or a video source (for a graphic PIP source)

When selecting one PIP source, the Presentation Switcher / Scaler automatically recognizes and displays the selected graphic PIP source on all the video displays[1] and the selected video source on all the graphic[1] displays, compliant to Table 4.

Table 4: PIP Source Appearance Availability[2]

The selected PIP source:	AV1, AV2, YC1, YC2, or component (video)	Component (graphics), DVI, VGA1, or VGA2
Appears on:	Component (graphics), DVI, VGA1, and VGA2	AV1, AV2, YC1, YC2, and component (video)
Does not appear on:	AV1, AV2, YC1, YC2, and component (video)	Component (graphics), DVI, VGA1, and VGA2

7.2.2 Activating the PIP Feature

After setting the PIP source you can activate the PIP by:

- Pressing the PIP button
- Pressing the PIP key on the infra-red remote control transmitter (see section 7.4, Figure 14)
- Switching on the PIP functionality via the OSD Menu (see section 8.5.4, Figure 33)

7.2.3 The PIP Source (Orange) Frame

Whether the PIP source is enclosed by an orange frame or not, determines the functionality of the operation buttons (on the machine and remote control transmitter). For example, when the Source Prompt is ON, and the PIP Frame is ON, you can instantly position the PIP using the preset position control keys[3].

When pressing the PIP button while the PIP Frame is ON (see section 8.5.4):

- The PIP appears enclosed in an orange frame
- After a few seconds[4] the orange frame disappears
- When pressing the PIP button once again, the orange frame reappears

When pressing the PIP button while the PIP Frame is OFF (see section 8.5.4), the PIP source toggles between PIP and no PIP, with no orange frame.

1 Even if the input signal is not connected. In this case the PIP appears over a blank screen

2 Since the component input is compatible with both video and graphic sources, the type of component source (video or graphic) determines where it is positioned in the table

3 On the infra-red remote control transmitter to instantly move the position of the PIP window to up to nine preset fixed locations (see Figure 14). For example, to move to the lower right corner of the image, press the ⑨ button

4 By default, 20 seconds. But you can reset the timeout (from 3 to 60 seconds), see section 8.5.6

7.2.4 Toggling between the PIP and the Screen Source (SWAP)

To toggle back and forth between the PIP Source and the main display, do the following:

- Press the SWAP key on the infra-red remote control transmitter (see Figure 14).
  The OSD SWAP status appears superimposed over the top right corner of the screen for a few seconds[1] only when the Source Prompt is ON, as Figure 11 illustrates.

Figure 11: OSD SWAP Status

7.2.5 PIP Characteristics

You can determine the following PIP characteristics:

- The PIP Size (1/4, 1/9, 1/16, 1/25, Split or User Define)
- The Horizontal and Vertical position, letting you place the PIP anywhere on the screen

7.2.5.1 Resizing the PIP

To resize the PIP (1/4, 1/9, 1/16, 1/25, User Define or Split – see the example in Figure 12):

- When the PIP is enclosed by an orange frame, use the UP and/or DOWN navigation control keys on the infra-red remote control transmitter (see Figure 14) or the UP and/or DOWN front panel OSD buttons; otherwise
- Use the OSD Menu buttons

1 By default, 20 seconds. But you can reset the timeout (from 3 to 60 seconds), see section 8.5.6

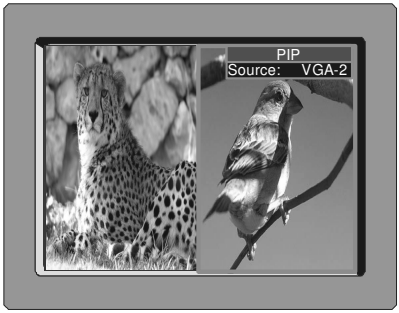

Figure 12: PIP Size – Split Screen

7.2.5.2 Moving the Position of the PIP

To move the position of the PIP, as illustrated in Figure 13, use the OSD menu (Utility>>PIP Setting>>H-Position; V-Position).

When the Source Prompt is ON, and the PIP Frame is ON, you can instantly position the PIP using the preset position control keys on the infra-red remote control transmitter.

When there is no orange frame, use the +, -, Up and DOWN buttons[1].

Figure 13: Moving the Position of the PIP

1 On the machine, or the navigation control keys on the infra-red remote control transmitter (see Figure 14)

7.3 Locking and Unlocking the Front Panel

You can lock the front panel[1] to safeguard the settings on the **CVG-724xl**.

To lock the front panel:

- Press the PANEL LOCK button or the MENU key on the infra-red remote control transmitter (see Figure 14) for a few seconds, until the "Key Lock On" OSD status appears superimposed over the top right corner of the screen for a few seconds[2], and all button LEDs turn off

Pressing a button when the panel is locked, displays the "Key Lock On" message superimposed over the top right corner of the screen and the PANEL LOCK button blinks for a few seconds.

To unlock the front panel (releasing the protection mechanism):

- Press and hold the PANEL LOCK button or the MENU key on the infra-red remote control transmitter (see Figure 14) for a few seconds, until the "Key Lock Off" OSD status appears superimposed over the top right corner of the screen for a few seconds[2]

7.4 The Infra-Red Remote Control Transmitter

You can control the Presentation Switcher / Scaler remotely, from the infra-red remote control transmitter, which:

- Is a hand held instrument with a convenient keypad that receives its power from 2 AAA size 1.5V DC batteries
- Has a range of up to 15 meters
- Delivers instantaneous results

Figure 14 and Table 5 define[3] the infra-red Remote Control Transmitter:

1 However, operation via RS-232 serial commands is still available

2 By default, 20 seconds. But you can reset the timeout (from 3 to 60 seconds), see section 8.5.6

3 The illustration in Figure 14 shows an enlarged view of three separate parts of the infra-red remote control transmitter

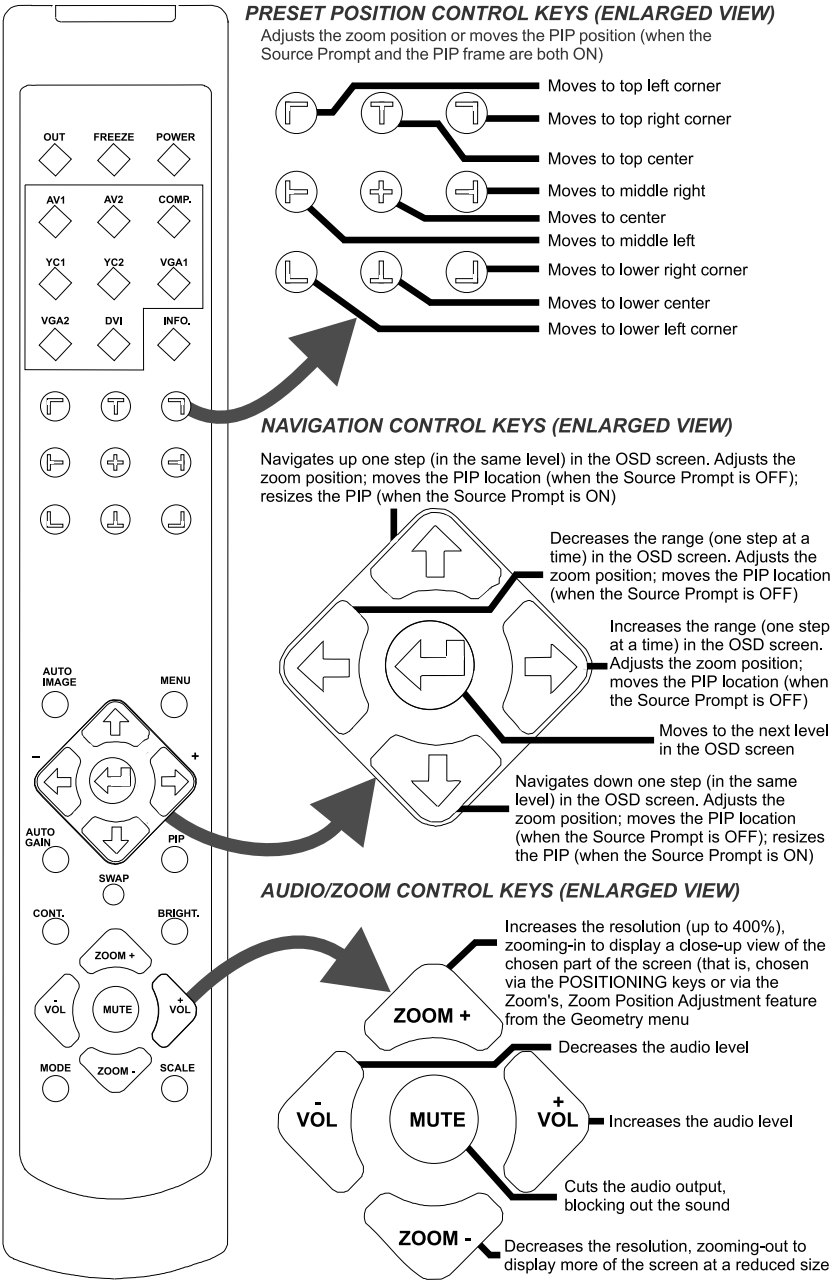
PRESET POSITION CONTROL KEYS (ENLARGED VIEW)
Adjusts the zoom position or moves the PIP position (when the Source Prompt and the PIP frame are both ON)
Moves to top left corner
Moves to top right corner
Moves to top center
Moves to middle right
Moves to center
Moves to middle left
Moves to lower right corner
Moves to lower center
Moves to lower left corner
OUT
FREEZE
POWER
AV1
AV2
COMP.
YC1
YC2
VGA1
VGA2
DVI
INFO.
NAVIGATION CONTROL KEYS (ENLARGED VIEW)
Navigates up one step (in the same level) in the OSD screen. Adjusts the zoom position; moves the PIP location (when the Source Prompt is OFF); resizes the PIP (when the Source Prompt is ON)
Decreases the range (one step at a time) in the OSD screen. Adjusts the zoom position; moves the PIP location (when the Source Prompt is OFF)
Increases the range (one step at a time) in the OSD screen. Adjusts the zoom position; moves the PIP location (when the Source Prompt is OFF)
Moves to the next level in the OSD screen
Navigates down one step (in the same level) in the OSD screen. Adjusts the zoom position; moves the PIP location (when the Source Prompt is OFF); resizes the PIP (when the Source Prompt is ON)
AUTO IMAGE
MENU
AUTO GAIN
PIP
SWAP
CONT.
BRIGHT.
ZOOM +
VOL
MUTE
VOL
MODE
ZOOM -
SCALE
AUDIO/ZOOM CONTROL KEYS (ENLARGED VIEW)
Increases the resolution (up to 400%), zooming-in to display a close-up view of the chosen part of the screen (that is, chosen via the POSITIONING keys or via the Zoom's, Zoom Position Adjustment feature from the Geometry menu
Decreases the audio level
Increases the audio level
Cuts the audio output, blocking out the sound
Decreases the resolution, zooming-out to display more of the screen at a reduced size

Figure 14: Infra-Red Remote Control Transmitter

Table 5: Infra-Red Remote Control Transmitter Functions

Keys	Function
OUT	Selects the output resolution
FREEZE	Pauses the output video
POWER	Cycles power
INPUT SELECTOR[1]	8 separate keys for selecting each of the following sources: AV1, AV2, COMP. (Component) YC1, YC2, VGA1, VGA2 and DVI
INFO.	Defines the main source, PIP source, whether mute is activated, output mode, as well as the firmware version number
PRESET POSITION CONTROL[2]	Adjusts the zoom[3] position[4] or moves the PIP position when the Source Prompt is ON
AUTO IMAGE	Assesses the image and improves the quality accordingly, by automatically adjusting the phase, frequency and position
MENU	Displays the OSD Menu screen[5] and locks/unlocks the front panel[6]
NAVIGATION CONTROL[7]	Allows maneuvering within an OSD screen (all keys); adjusts the zoom position (4 keys); moves the PIP location when the Source Prompt is OFF (4 keys); resizes the PIP when the Source Prompt is ON (2 keys)
AUTO GAIN	Automatically adjusts the brightness and contrast
SWAP[8]	Toggles between the PIP content and the screen source content
PIP[9]	Selects the picture-in-picture function and illuminates the PIP button[10]
CONT.	Displays the contrast status[11]
BRIGHT.	Displays the brightness status[11]
AUDIO/ZOOM CONTROL[7]	Allows volume and zoom control
MODE	Toggles between each of the following modes: Normal, Presentation, Cinema, Nature, User 1 and User 2
SCALE	Toggles between each of the following Aspect Ratios: Normal, Wide Screen, Pan & Scan, 4:3 Output, and 16:9 Output[12]

1 Press to select the source. Can be programmed (see section 8.5.9)

2 Consists of a set of nine separate keys. See the illustration in Figure 14 which shows an enlarged view of this part of the infra-red remote control transmitter

3 A small rectangle inside a transparent pop-up OSD Enlarge status box appears at the top right corner of the screen showing the position of the zoom within a picture (see Figure 24)

4 For example, when enlarging the display, press this button: ⏎ to go to the lower right corner of the display area

5 As Figure 15 illustrates

6 See section 7.3

7 Consists of a set of five separate keys. See the illustration in Figure 14 which shows an enlarged view of this part of the infra-red remote control transmitter

8 See section 7.2.4

9 Not available on the CVG-719xl

10 See section 7.2

11 Adjust using the +/- keys

12 See section 8.4.1

8 Configuring the CVG-724xl via the OSD MENU Screens

The OSD superimposes a menu on the screen from which you can configure and control each input signal on your **CVG-724xl**, using the MENU, ENTER, –, +, UP and DOWN OSD buttons on the front panel and the remote transmitter.

To use the OSD menus:

1. Select the desired input signal.
2. Use the menu buttons as follows:
   - Press the MENU front panel OSD button or the MENU key on the infra-red remote control transmitter (see Figure 14) to display the MENU screen (see Figure 15), which displays six interactive icons[1] (defined in Figure 16)
   - Press the MENU front panel OSD button or the MENU key on the infra-red remote control transmitter to move to the previous level in the OSD screen (Esc)
   - Press the UP or DOWN buttons to select menu icons and then press ENTER
   - Use + and – buttons to increase and decrease the (numerical) rate respectively[2]

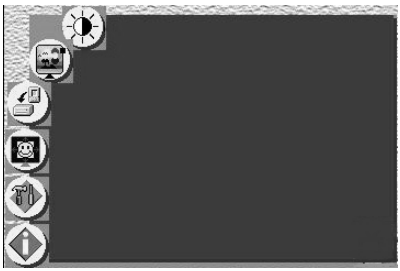

Figure 15: MENU Screen

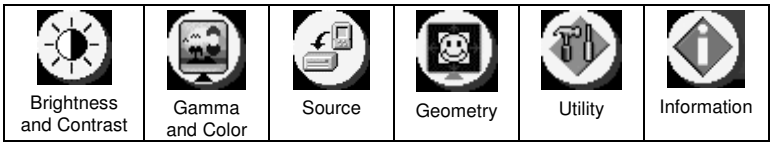

Figure 16: Menu Screen Icons

1 Each icon represents a Level 1 function. In addition to Level 1, the OSD structure includes Level 2 (a subset of level 1), Level 3 (a subset of level 2), Level 4 (a subset of level 3) and a numerical range

2 By pressing the +, -, UP and DOWN buttons continuously, you can speed up their response. For example, to roughly set the brightness to a higher level, open "Brightness and Contrast">Brightness, and press and hold the + button. For step-by-step response, press and release these buttons as many times as needed

8.1 Controlling the Brightness and Contrast

Figure 17 and Table 6 define the Brightness and Contrast screen.

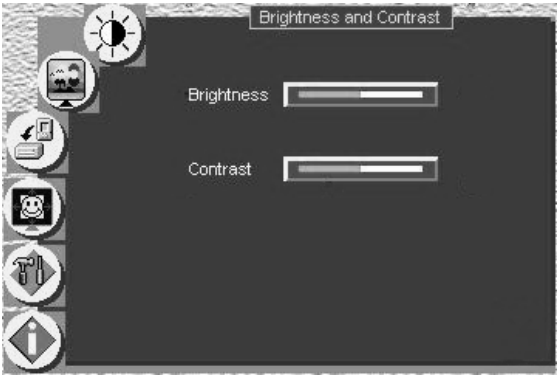

Figure 17: Brightness and Contrast Screen

Table 6: Brightness and Contrast Screen Functions

Setting	Function	Range	Default
Brightness	Press + and – buttons to increase or decrease the brightness and contrast	0 to 128	64
Contrast		0 to 128	64

8.2 Controlling the Gamma and Color

Figure 18 and Table 7 define the Gamma and Color Screen.

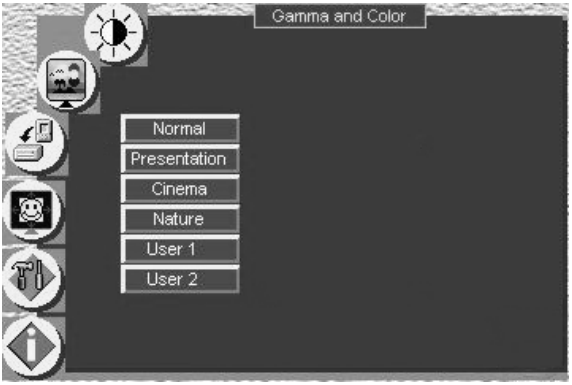

Figure 18: Gamma and Color Screen

Table 7: Gamma and Color Screen Functions

Button	Function	Range	Default
Normal	Average Setting		
Presentation	Higher black level		
Cinema	Higher white balance		
Nature	Higher green level		
User 1/2	Set to customize, and save (press MENU) User 1 and User 2 to recall for later use		
	Gamma	-10 to 10	0
	Color Temperature		
	Red	0 to 127	64
	Green	0 to 127	64
	Blue	0 to 127	64
	Color manager		
	Red	0 to 32	16
	Green	0 to 32	16
	Blue	0 to 32	16
	Yellow	0 to 32	16

8.3 Selecting the Source

Figure 19 illustrates the Source screen, displaying the active source[1] (main screen). Scroll up and down to change the source (same as selecting an INPUT with the remote transmitter or via the INPUT SELECTOR buttons).

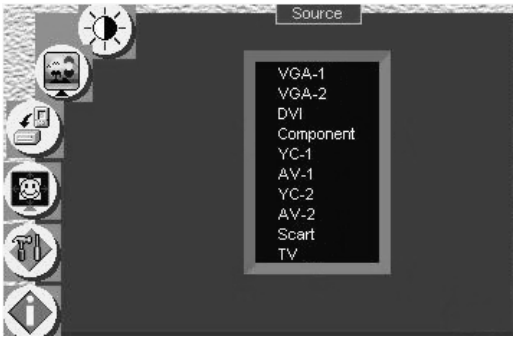

Figure 19: Source Selection Screen

8.4 Controlling the Scale Geometry

Figure 20 illustrates the main Geometry Screen, from which you can scale and zoom.

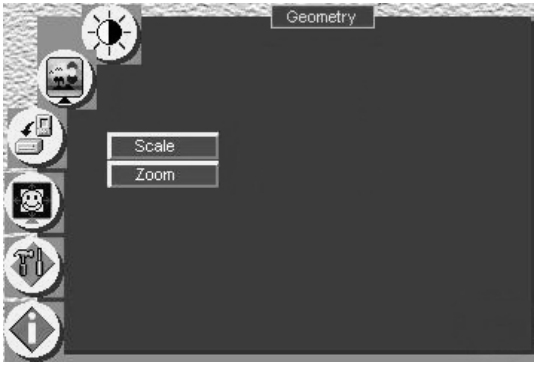

Figure 20: Geometry (Scale and Zoom) Screen

1 Only CVG-724xl has 2 VGA inputs; CVG-719xl and CVG-720xl have 1 VGA input

8.4.1 Setting the Scale Features

Figure 21 (for a graphic source), Figure 22 (for a video source) and Table 8 define the Scale feature on the main Geometry screen.

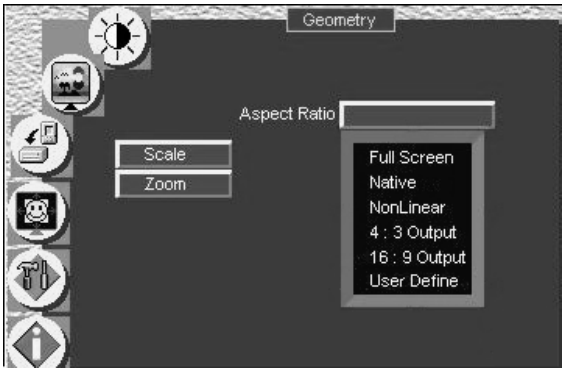

Figure 21: Geometry (Scale: Aspect Ratio) Screen – Graphic Source

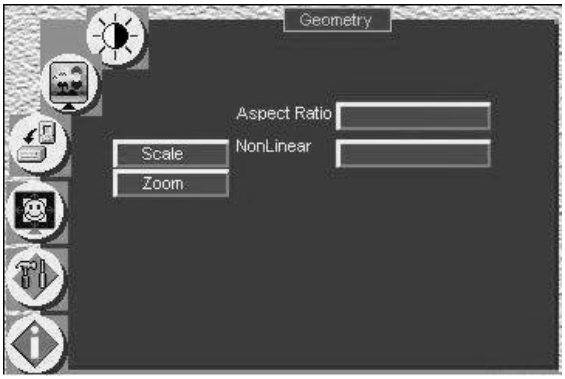

Figure 22: Geometry (Scale: Aspect Ratio) Screen – Video Source

Table 8: Geometry Scale Functions

Button	Function
Aspect Ratio	Set the aspect ratio according to your specific requirements—the native resolution—that is, depending on the specifications of the Plasma screen or projector: When using a VGA, DVI and/or component video[1] source, you can choose an aspect ratio from the following: Full Screen, Native, non-linear, 4:3 Output[2], 16:9 Output[3] and User Define[4] When using a composite video source and/or an s-Video source and/or component video[1] source, you can choose an aspect ratio from the following: Normal, Wide Screen, Pan[5] & Scan, 4:3 Output[2], 16:9 Output[3] and User Define[4]
Non-Linear[6]	For certain resolutions, select between Side, Middle and Off: Select Side to stretch the image from the center to the side; select Middle to leave the middle portion of the image untouched, while the sides are stretched; select Off to deactivate this feature

8.4.2 Adjusting the Zoom Ratio and Position

Figure 23 and Table 9 define the Geometry (Zoom) Screen.

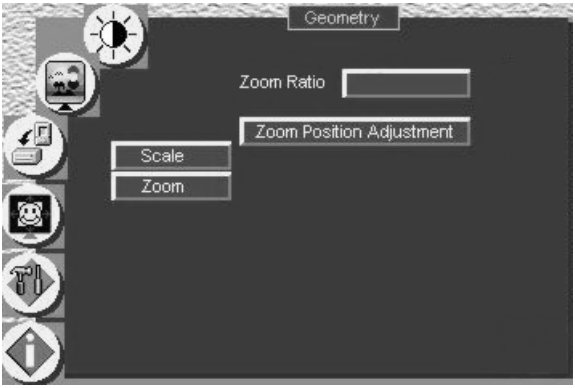

Figure 23: Geometry (Zoom) Screen

Table 9: Geometry Zoom Functions

Button	Function
Zoom Ratio	Set between 100% – 400%
Zoom Position Adjustment	Press the –, +, UP and DOWN OSD buttons arrows to set the Zoom position

1 Depending on the resolution of the component source

2 In this standard, the ratio between the width and the height is 4:3

3 In this standard (a Cinema mode standard used for movies and DVDs), the ratio between the length and height is 16:9 (or sometimes 1:2.35)

4 H-Zoom (-32 to +32), V-Zoom (-32 to +32), H-Pan (-32 to +32 and V-Pan (-32 to +32), 0 corresponds to a full screen

5 Panning the picture refers to resizing and cropping it

6 Converts a 4:3 standard-definition video to a 16:9 wide-aspect definition ratio in a non-linear manner

The zoom ratio and the zoom position are illustrated by a small rectangle inside a transparent pop-up OSD Enlarge status box that appears at the top right corner of the screen, as the example in Figure 24 illustrates:

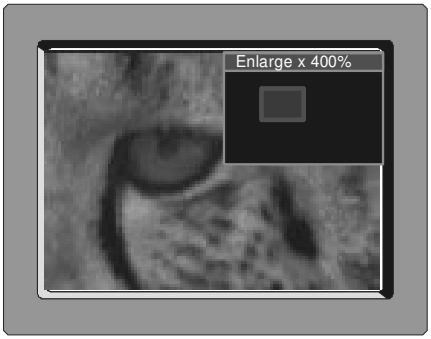

Figure 24: OSD Enlarge Status

When you change the zoom ratio or zoom position, the screen image is adjusted accordingly, and the change is reflected in the pop-up OSD Enlarge status box.

8.4.2.1 Adjusting the Zoom Ratio

You can adjust the zoom ratio to up to 400% via one or both of these methods:

- Using the Zoom + and/or the Zoom - control keys[1] on the infra-red remote control transmitter (see Figure 14). The pop-up OSD Enlarge status box continuously displays the zoom ratio and position, as Figure 24 illustrates
- Using the OSD Menu buttons, as Figure 25 illustrates

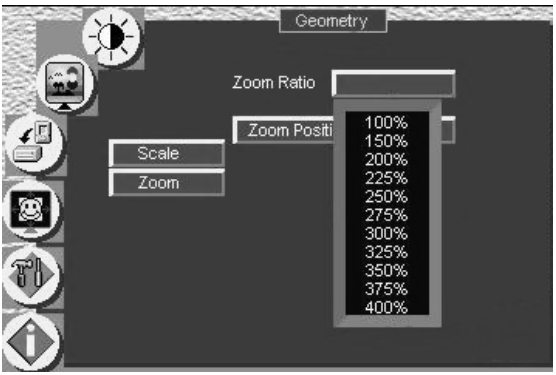

Figure 25: Geometry (Zoom Ratio) Screen

1 The and the buttons

8.4.2.2 Adjusting the Zoom Position

You can adjust the zoom position via one or more of the following methods:

- Using the preset position control keys (see Figure 26) on the infra-red remote control transmitter (see Figure 14), which instantly move the position of the zoom to up to nine preset fixed locations[1]

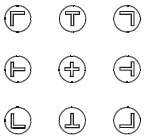

Figure 26: Preset Position Control Keys

- Using the navigation control keys on the infra-red remote control transmitter (see Figure 14), to fine tune the zoom position (that is, to slowly zoom-in at any location on the screen)[2], as Figure 27 illustrates

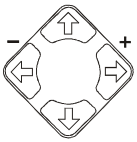

Figure 27: Navigation Control Keys

- Using the OSD Menu buttons (see Figure 28)[3]

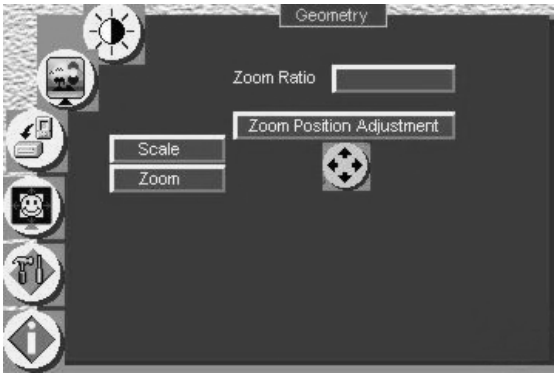

Figure 28: Geometry (Zoom Position Adjustment) Screen

1 For example, to zoom-in to the lower right corner of the image, press the button

2 For example, to zoom-in toward the lower right of the image, press the and the buttons separately, as required

3 For example, to zoom-in to the lower right part of the image instead of the top left part, press the + and DOWN OSD Menu buttons on the front panel separately, as required

8.5 Configuring via the Utility Screens

Figure 29 shows the Utility menu, from which you can define the machine settings.

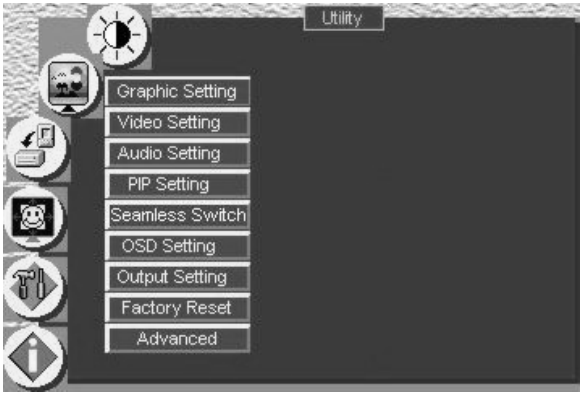

Figure 29: Utility Screen

8.5.1 Choosing the Graphic Utility Settings

From the Graphic[1] Setting Utility screen (see Figure 30), you can set the color format, position, Color, hue, sharpness, frequency and phase, as well as auto image and auto gain (described in Table 10).

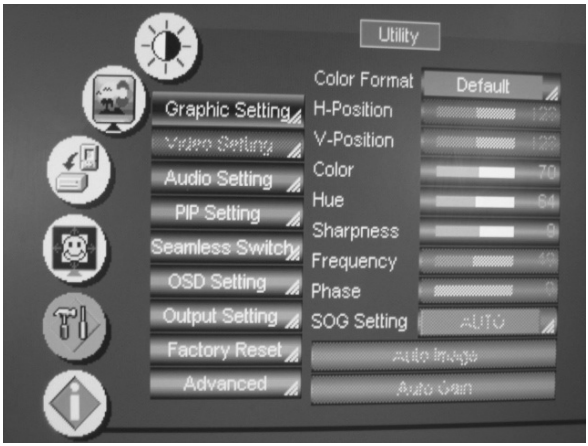

Figure 30: Graphic Setting Utility Screen

1 When a VGA source is selected, "Graphic Setting" will be shown. "HDTV Setting" (illustrated in Figure 38) will appear when an HDTV source is selected

Table 10: Graphic Setting Utility Screen Features

Button	Function	Range	Default
Color Format	Selecting the color format lets you select RGB or YUV[1] colorspace. When the Default setting is chosen, the colorspace is set according to the detected input resolution		
H-Position	Set the horizontal position of the display	0 to 255	128
V-Position	Set the vertical position of the display	0 to 255	128
Color	Set the intensity of the color	0 to 128	70
Hue	Set the hue	0 to 128	64
Sharpness	Set the sharpness	0 to 16	8
Frequency	Set the frequency	0 to 100	49
Phase	Set the phase of the input sampling clock	0 to 31	0
SOG Setting	The SOG (Sync on Green) setting is enab led only when the graphics signal is in YUV format (component). Otherwise it is disabled. Select RGsB (sync on green), HDTV (standard HDTV), or AUTO (automatic identification)		
Auto Image	Assesses the image and improves the quality accordingly, by automatically adjusting the phase, frequency and position		
Auto Gain	Automatically adjusts the brightness and contrast		

8.5.2 Choosing the Video Utility Settings

From the Video Setting Utility screen (see Figure 31), you can set the video standard, color, hue, sharpness, and position.

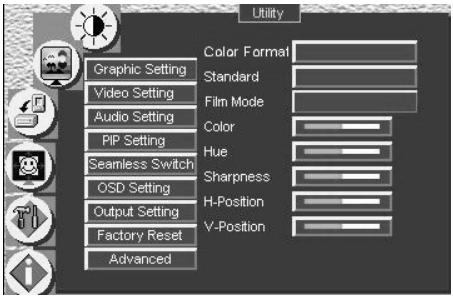

Figure 31: Video Setting Utility Screen

Table 11: Video Setting Utility Screen Features

Button	Function	Range	Default
Color Format	Selecting the color format lets you select RGB or YUV[1] colorspace. When the Default setting is chosen, the colorspace is set according to the detected input resolution		
Standard	Select the video standard: Auto (auto detects the standard), NTSC, NTSC4.43, PAL, PAL-N, PAL-M, SECAM		Auto
Film Mode	Select ON for 3:2 or 2:2 pulldown		
Color	Set the color	0 to 128	64
Hue	Set the hue	0 to 128	64
Sharpness	Set the sharpness	0 to 16	11
H-Position	Set the horizontal position of the display	0 to 20	15
V-Position	Set the vertical position of the display	0 to 39	10

1 That is Y, B-Y, R-Y colorspace, also known as Y, C_b, C_r or Y, P_b, P_r

8.5.3 Choosing the Audio Utility Settings

From the Audio Setting Utility screen (see Figure 32), you can set the volume, treble, bass, and choose between stereo and mono.

Figure 32: Audio Setting Utility Screen

Table 12: Audio Setting Utility Screen Features

Button	Function	Range	Default
Volume	Adjust the volume[1]	0 to 32	28
Treble	Adjust treble	0 to 12	6
Bass	Adjust bass	0 to 12	6
Stereo	Select Stereo ON or OFF		ON
Control	Select Master to apply audio parameters[2] simultaneously to all the inputs; select Individual to apply an individual setting per input; select Linked to apply the relative[3] changes in the audio settings to all the inputs		Master

8.5.4 Choosing the PIP Utility Settings

Figure 33 and Table 13 define the PIP Setting Utility screen.

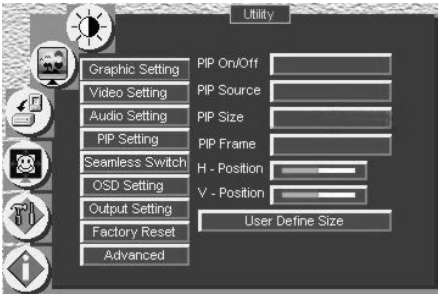

Figure 33: PIP Utility Screen

1 When the volume is set to its default value (28), the output volume is equal to the input volume

2 Volume Bass and Treble

3 For example, an increase of two steps in the volume will increase the volume by two steps for each input

Table 13: PIP Setting Utility Screen Features

Button	Function	Range	Default
PIP On/Off	Activate or deactivate the PIP feature		
PIP Source	Select the PIP source, as described in section 7.2.1		
PIP Size	Select between: 1/25, 1/16, 1/9, 1/4, Split or User Define		
PIP Frame	Allows the PIP to appear with or without an orange frame		
H - Position	Set the horizontal position of the PIP	0 to 36	1
V - Position	Set the vertical position of the PIP	0 to 36	1
User Define Size	After selecting the User Define PIP Size, set the PIP size (H-size and V-Size)	0 to 255	63

8.5.5 Choosing the Seamless Switch Utility Settings

From the Seamless Switch Utility screen (see Figure 34), you can choose the image transition speed Mode and activate the Auto Search, as described in Table 14:

Figure 34: Seamless Switch Utility Screen

Table 14: Seamless Switch Utility Screen Features

Button	Function
Mode	Select image between: Fast – an immediate switch, without checking the resolution. However, the image transition may appear unstable Safe – a smooth image transition - the input resolution at the input is checked and outputted after a few seconds delay, but it takes longer than fast Moderate – between fast and safe
Auto Search	Activate the Auto Search to find the active source when the unit is powered up; or deactivate the Auto Search (when the unit is powered up, displays the source selected prior to power down)

8.5.6 Choosing the OSD Utility Settings

Figure 35 and Table 15 define the OSD Setting Utility screen.

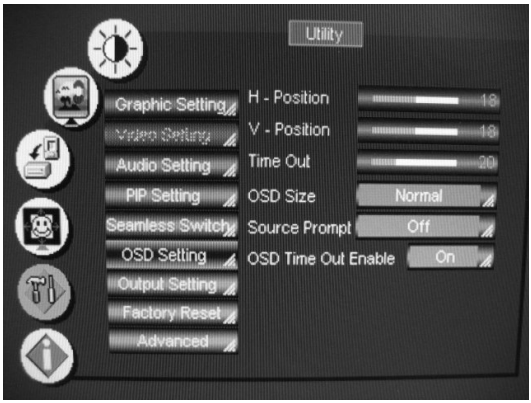

Figure 35: OSD Setting Utility Screen

Table 15: OSD Setting Utility Screen Features

Button	Function
H-Position	Set the OSD menu position
V-Position	
Time Out	Set the timeout for source prompts and OSD menu[1]
OSD Size	Set the OSD size to Normal or Double the normal size[2]
Source Prompt	Set the Source Prompt[3]
OSD Time Out Enable	Set to OFF for OSD to remain indefinitely on screen

1 By default, 20 seconds. But you can reset the timeout (from 3 to 60 seconds). Set to OFF to disable the timeout function

2 You cannot double the OSD size when the output resolution is 640x480

3 We recommend that you set the source prompt ON, when adjusting the system. During a presentation, set the source prompt OFF to avoid the appearance of OSD screen labels

8.5.7 Choosing the Output Utility Settings

Figure 36 and Table 16 define the Output Utility settings. From the Output Setting Utility screen, you can set the Resolution, Refresh Rate, and a user definable output mode (see Figure 38 and Table 17).

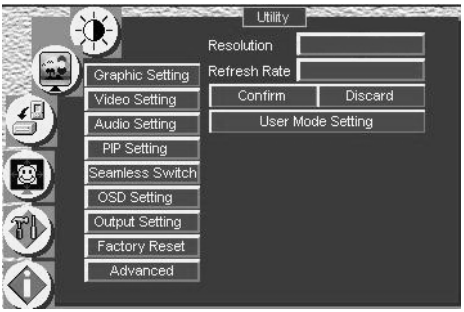

Figure 36: Output Setting Utility Screen

Table 16: Output Setting Utility Screen Features

Button	Function
Resolution	Select the desired resolution from the list, including the User Define resolution (for advanced users only) You can cycle the output resolutions (choosing the pixel resolution) by pressing the OUT key on the infra-red remote control transmitter (see Figure 14). The OSD status appears superimposed over the top right corner of the screen for a few seconds[1], as Figure 37 illustrates[2]
Refresh Rate	Select the refresh rate (for example[3], 50Hz, 60Hz, 75Hz or 85Hz)
Confirm / Discard	Select to confirm or reject Resolution and Refresh Rate selections
User Mode Setting	Set a user definable output mode[4] (see Figure 38)

Figure 37: OSD Output Status

1 By default, 20 seconds. But you can reset the timeout (from 3 to 60 seconds)

2 Adjusting the output resolution results in a corresponding adjustment to the size of the OSD status window

3 Different resolutions allow different choices of refresh rates

4 Recommended for advanced users only – non-standard settings may not be recognized by the display device

8.5.7.1 The User Mode Setting

Figure 38 and Table 17 define the User Mode Setting[1].

Figure 38: Output Setting User Mode Setting Utility Screen

Table 17: User Mode Setting Definitions

User Mode Setting Definitions	
HT:	Horizontal total
HW:	Horizontal sync pulse width
HS:	Horizontal active start point
HA:	Horizontal active region
HP:	Horizontal polarity
VT:	Vertical total
VW:	Vertical sync pulse width
VS:	Vertical active start point
VA:	Vertical active region
VP:	Vertical polarity
OCLK:	Output clock
Group	Set up to three different sets of parameters for user defined resolutions
Confirm:	Confirm the action
Discard:	Cancel the action
Set Current:	Import the values of the currently selected output resolution into the User Mode Setting

1 These values will be used when "User Define" is selected as the output resolution

8.5.8 Choosing Factory Reset

From the Factory Reset Utility screen (see Figure 39), you can reset your **CVG-724xl** to its preset default setting:

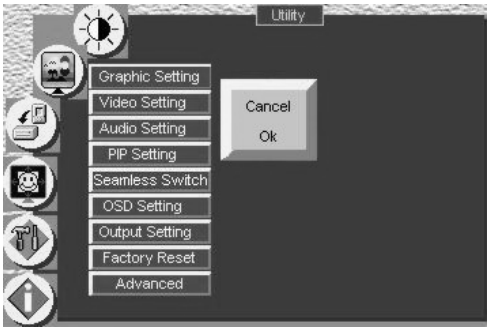

Figure 39: Factory Reset Utility Screen

8.5.9 Choosing Advanced Utility Settings

Figure 40 and Table 18 define the Advanced Utility screen.

Figure 40: Advanced Utility Screen

Table 18: Advanced Utility Screen Features

Button	Function
Input Button	You can set the function of the input button besides selecting the input signal: Freeze/Blank (press selected input button once to freeze the frame, press again to create a blank screen and again to return to normal state); Freeze (press once to freeze the frame, press again to cancel freeze); Blank (press once to insert blank screen, press again to return to display); Ignore (input button ignores freeze and blank – you can freeze the frame or insert a blank screen only via Freeze and Blank buttons respectively)
Startup Logo	Choose ON for the start up logo to appear on the screen or OFF for it not to appear
Blank Color	Set the blank color, the color that appears on the screen when the blank button is pressed
Background	Set the background screen color: You can select the screen color (black or blue) when there is no active source
Lock Option	Set the panel lock options (see Figure 41): Set the Save option to ON to save the lock status when the machine is powered down Set the Input Lock to OFF so you can still use the SOURCE button on the front panel even when the lock button is on
Mode Define	When the Measure Mode is set to Default, it measures and displays the parameters of the currently selected input (see Figure 42 and Table 19) When the Measure Mode is set to User Define, you can set the selected input to a non-standard resolution (see section 8.5.9.1)

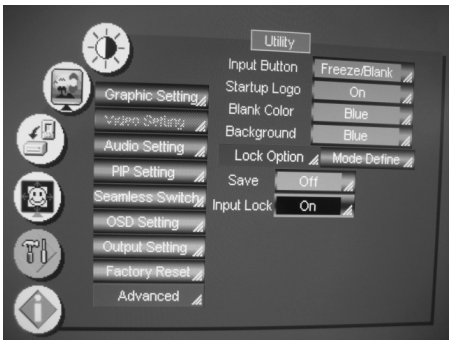

Figure 41: Lock Option Screen

Figure 42 and Table 19 define the Mode Define features.

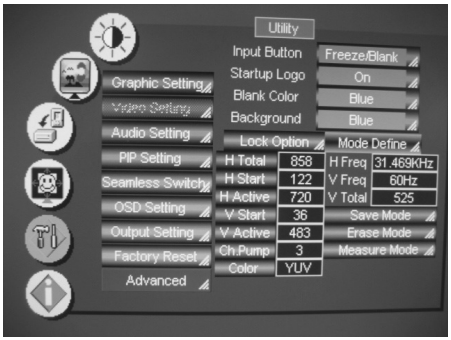

Figure 42: Mode Define Screen

Table 19: Mode Define Features

Mode Define Definitions	
H Total	Horizontal total
H Start	Horizontal active start point
H Active	Horizontal active region
V Start	Vertical active start point
V Active	Vertical active region
Ch. Pump	Charge pump current
Color	Color format
H Freq	Horizontal Frequency
V Freq	Vertical Frequency
V Total	Vertical total
Save Mode	Save the user defined resolution[1]
Erase Mode	Erase the user defined resolution
Measure Mode	Select between Default and User Define

8.5.9.1 Setting an Input to a Non-standard Resolution (Example)

When connecting a source with a non-standard resolution, you have to set your scaler to this resolution so it will correctly identify this source. The Advanced mode lets you set up to three non-standard resolutions. To set an input to a non-standard resolution, for example to 1100x800, do the following:

1. Connect the source (with the non-standard resolution, in this example – 1100x800) to the appropriate input connector on your scaler and press the appropriate INPUT SELECTOR button.
2. Connect the VIDEO OUT 1/2 HD15F connector to a video acceptor.
3. Turn the machines ON.
4. Press menu, go to Utility>Advanced> Mode Define, and press ENTER.
5. Scroll to Measure Mode, press ENTER and select User Define.
6. Set H Active to 1100 and V Active to 800, and set the remaining parameters according to the input data.
7. Scroll to the Save Mode and save the new resolution.
8. Open the Information screen and check that the new resolution appears in the Main Source line[2] (see Figure 43).

1 You can save up to three settings

2 Note that for the Scaler to correctly read the input, its OCLK value should be different from that of any other defined input of the scaler

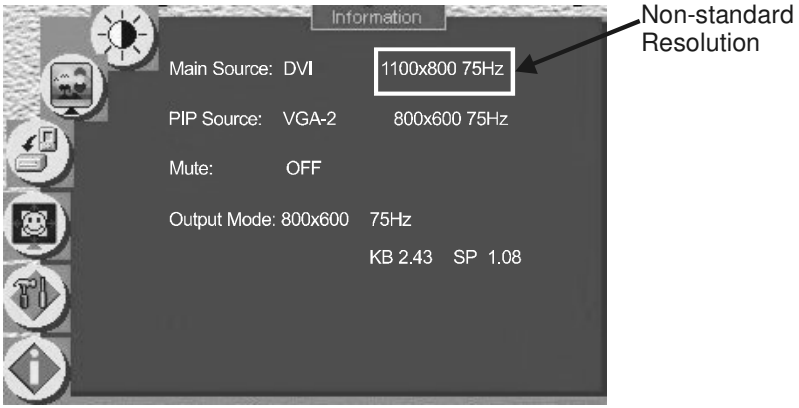

Figure 43: Non-standard Resolution in the Information Screen

8.6 Verifying Configuration Details via the Information Screen

From the Information screen (see Figure 44), you can verify the main source, PIP source, whether mute is activated, output mode, as well as the firmware version number:

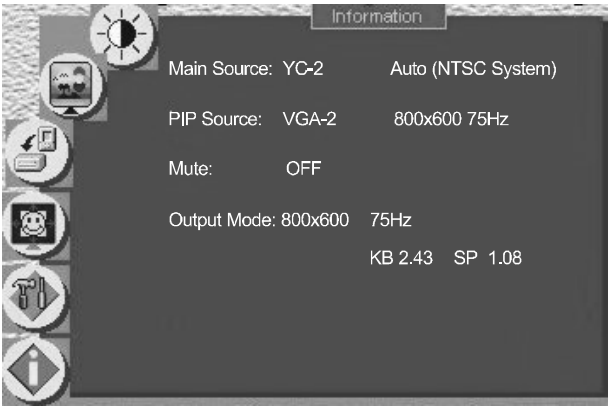

Figure 44: Information Screen

9 Technical Specifications

Table 20 includes the technical specifications:

Table 20: Technical Specifications[1] of the Presentation Switchers / Scalers

INPUTS:	2 x CV 1 Vpp/75 Ω on RCA connectors; 2 x Y/C (s-Video) 1 Vpp (Y), 0.3Vpp (C) / 75 Ω on 4 pin connectors; 1 x Component (Y, Pb/Cb, Pr/Cr) (both progressive and interlaced signals accepted) HDTV on RCA connectors; 1 x VGA (VGA/SVGA/XGA/UXGA +HDTV on an HD15F connector (2 x VGA on the CVG-724xl); and 1x DVI-D connector. For each video input there is a corresponding (unbalanced) audio stereo input on a terminal block connector
MAX. OUTPUT LEVEL:	AUDIO: 4.88Vpp[2]
OUTPUTS:	2 x RGBHV (VGA) format on HD15 connectors; component HDTV on the same HD15 connectors for 480p, 720p 1080i and 1080p (on the CVG-724xl). One line-level stereo audio on terminal blocks. One stereo loudspeakers output 2x5W (RMS) on terminal blocks
OUTPUT RESOLUTIONS:	VGA (640x480), SVGA (800x600), XGA (1024x768), SXGA (1280x1024), UXGA (1600x1200), 1024x852, 1024x1024, 1366x768, 1365x1024, 1280x720, 720x483, 852x480, 1400x1050, 1280x768*, as well as a user definable output mode. Also supports 480p, 720p, 1080i and 1080p (on the CVG-724xl)
CONTROL:	Front panel buttons / OSD, IR remote control, RS-232 on a DB-9 connector, Picture-In-Picture (not available on the CVG-719xl): Video in Graphics (or vice versa) in any size and at any location, or Split Screen (2 images side-by-side)
ADDITIONAL CONTROLS:	Freeze, zoom, different selectable vertical refresh rates, Video and Audio ProcAmp control, output image scaling and aspect ratio change
POWER SOURCE:	100-240 VAC, 50/60 Hz, 30VA automatic power supply
DIMENSIONS:	19" (W), 9.3" (D) 1U (H) rack mountable
WEIGHT:	3 kg (6.6 lbs.) approx.
ACCESSORIES:	Null modem adapter, IR remote control, power cord[3]

Table 21: Technical Specifications of the VGA Input Signal

Sync Type Support		**RGBHV, RGBHs, RGsB (not supported)**	
RGB Signal	**Resolution**	**Vertical Frequency (Hz)**	**Horizontal Frequency (kHz)**
640x480	640x480	60	31.469l
	640x480	67	35.0001
	640x480	72	37.861l
	640x480	75	37.500l
	640x480	85	43.269l
720x400	720x400	70	31.469l
	720x400	85	37.92
800x600	800x600	56	35.156l
	800x600	60	37.879l
	800x600	72	48.077
	800x600	75	46.875l

1 Specifications are subject to change without notice

2 With maximum amplification (volume set to maximum), AUDIO IN maximum is 1.9Vpp, and the AUDIO OUT maximum is 4.8Vpp

3 We recommend that you use only the power cord that is supplied with this machine

Sync Type Support		RGBHV, RGBHs, RGsB (not supported)	
RGB Signal	**Resolution**	**Vertical Frequency (Hz)**	**Horizontal Frequency (kHz)**
	800x600	85	53.674l
832x624	832x624	75	49.7001
1024x800	1024x800	84	70.8401
1024x768	1024x768	60	48.363l
	1024x768	70	56.476l
	1024x768	75	60.200l
	1024x768	85	68.677l
1152x864	1152x864	75	67.500l
1152x870	1152x870	75	68.700l
1152x900	1152x900	66	61.846l
	1152x900	76	71.808l
1280x960	1280x960	60	60.000l
	1280x960	85	85.938l
1280x1024	1280x1024	60	63.981l
	1280x1024	75	79.976l
	1280x1024	76	81.130l
	1280x1024	85	91.146l
1400x1050	1400x1050	60	66.000l
	1400x1050	70	77.000l
	1400x1050	72	79.200l
	1400x1050	75	82.500l
	1400x1050	80	88.000l
	1400x1050	85	93.500l
1600x1200	1600x1200	60	75.000l
	1600x1200	65	81.250l
	1600x1200	70	87.500l
	1600x1200	75	93.750l
	1600x1200	85	106.250l
1080l	1920x540	60,50	33.6701
720P	1280x720	60 ,50	45.363l
480P	720x483	60	31.469l
576P	720x576	50	31.256l
576l	720x275	50	15.600l
480l	720x235	60	15.750l
1024x576	1024x576	60	44.000l
	1024x576	72	58.890l
1280x768		50,60	
1366x768	1366x768	50	40.8
	1366x768	60	48.85

Table 22: Technical Specifications of the DVI Input Signal

DVI Signal	Resolution	Vertical Frequency (Hz)	Horizontal Frequency (kHz)
640x480	640x480	60	31.469l
	640x480	67	35.0
	640x480	72	37.861l
	640x480	75	37.500l
	640x480	85	43.269l
720x400	720x400	70	31.469l
	720x400	85	37.92
800x600	800x600	56	35.156l
	800x600	60	37.879l
	800x600	72	48.077
	800x600	75	46.875l
	800x600	85	53.674l
1024x768	1024x768	60	48.363l
	1024x768	70	56.476l
	1024x768	75	60.023l
1280x1024	1280x1024	60	63.981l
	1280x1024	75	79.976l
	1280x1024	76	81.130l
	1280x1024	85	91.146l
1400x1050	1400x1050	60	66.000l
	1400x1050	70	77.000l
1600x1200	1600x1200	60	75.000l
1080i	1920x540	60	33.6701
720p	1280x720	60	45.363l
480p	720x483	60	31.469l
576p	720x576	50	31.256l
1366x768	1366x768	50	40.8
	1366x768	60	48.85
1365x1024	1365x1024	50	52.73
	1365x1024	60	63.6
	1365x1024	75	80.29

Table 23: Technical Specifications of the Video Input Signal

Standard	NTSC, NTSC4.43, PAL, PAL-M, PAL-N, SECAM
Format	Composite, Y/C, Component

Table 24: Technical Specifications of the HDTV Input Signal

HDTV mode		**1080i, 720p, 480p, 576p, 1024x576p**		
DVI Signal	**Resolution**	**Vertical Frequency (Hz)**	**Horizontal Frequency (kHz)**	**Remarks**
1080i	1920x540	60	33.6701	YPbPr
	1920x540	50	28.1251	YPbPr
720p	1280x720	60	45.363l	YPbPr
	1280x720	50	37.500l	YPbPr
480p	720x483	60	31.469l	YPbPr
576p	720x576	50	31.256l	YPbPr
1024x576p	1024x576	50	31.256l	YPbPr
576i	720x275	50	15.600l	YCbCr
480i	720x235	60	15.750l	YCbCr

10 CVG-724xl Communication Protocol

This protocol includes two types of commands: 3 bytes and 4 bytes.

In the 3 bytes command type, the scaler operates in a fast mode because it does not save the information immediately. The sent command is executed immediately, but the status of the scaler is saved in the non-volatile memory only after 30 sec of no activity.

In the 4 bytes command type, the scaler executes the save process immediately after each command. This operation consumes more time (adding about 2 sec).

Set and Get command:

Set Command: Y■Control_Type■Function■Param■CR

■ **Reply**: Z■Control_Type■Function■Param■CRDone>CR

Get Command: Y■Control_Type■Function■Param■CR

■**Reply**: Z■Control_Type■Function■Param■CR

Example:

1. "Y■ 1■17■0-127■CR" -> set Contrast value. (4th byte is between 0 and 127).
   "Z■1■17■0-127■CR>" --> Reply value
   "DoneCR" --> command setting success
2. "Y■4■21■0-17■CR" -> get current output resolution. (4th byte is between 0 and 17).
   "Z■4■21■0-17■CR>" -> Reply value
3. "Y■0■35■CR" -> Volume down. Each time we apply this command will decrease the volume level by one step.
   "Z■0■35■CR>"-->Reply value
   "DoneCR" --> command setting success

Definition:

■: ASCII Code 0x20

CR: Ascii Code 0xD or 0xA

After set type Command setting, system will respond a string as "Done"

Control Type	Function	Param (for Set)	Function Description		Comment
0	0	N/A	Output		
0	1	N/A	Freeze		
0	2	N/A	Power		
0	3	N/A	AV1		
0	4	N/A	AV2		
0	5	N/A	Comp		
0	6	N/A	YC1		
0	7	N/A	YC2		
0	8	N/A	VGA1		
0	9	N/A	VGA2 (CVG-724xl Only)		
0	10	N/A	DVI		
0	11	N/A	Information		
0	12	N/A	Area Left Up		
0	13	N/A	Area Middle Up		
0	14	N/A	Area Right Up		
0	15	N/A	Area Left Center		
0	16	N/A	Area Middle Center		
0	17	N/A	Area Right Center		
0	18	N/A	Area Left Down		
0	19	N/A	Area Middle Down		
0	20	N/A	Area Right Down		
0	21	N/A	AutoImage		
0	22	N/A	Menu		
0	23	N/A	Up		
0	24	N/A	Left		
0	25	N/A	Enter		
0	26	N/A	Right		
0	27	N/A	Down		
0	28	N/A	AutoGain		
0	29	N/A	PIP		
0	30	N/A	Swap		
0	31	N/A	Contrast		
0	32	N/A	Brightness		
0	33	N/A	Zoom In		
0	34	N/A	Zoom Out		
0	35	N/A	Volume Down		
0	36	N/A	Mute		
0	37	N/A	Volume Up		
0	38	N/A	Color Mode		
0	39	N/A	Aspect Ratio		
1: Set 2: Get	0	-10~10	Gamma and Color: User1 Gamma		
1: Set 2: Get	1	0~127	Gamma and Color: User1 Color Temp Red		
1: Set 2: Get	2	0~127	Gamma and Color: User1 Color Temp Green		

Control Type	Function	Param (for Set)	Function Description		Comment
1: Set 2: Get	3	0~127	Gamma and Color: User1 Color Temp Blue		
1: Set 2: Get	4	0~32	Gamma and Color: User1 Color Manager Red		
1: Set 2: Get	5	0~32	Gamma and Color: User1 Color Manager Green		
1: Set 2: Get	6	0~32	Gamma and Color: User1 Color Manager Blue		
1: Set 2: Get	7	0~32	Gamma and Color: User1 Color Manager Yellow		
1: Set 2: Get	8	-10~10	Gamma and Color: User2 Gamma		
1: Set 2: Get	9	0~127	Gamma and Color: User2 Color Temp Red		
1: Set 2: Get	10	0~127	Gamma and Color: User2 Color Temp Green		
1: Set 2: Get	11	0~127	Gamma and Color: User2 Color Temp Blue		
1: Set 2: Get	12	0~32	Gamma and Color: User2 Color Manager Red		
1: Set 2: Get	13	0~32	Gamma and Color: User2 Color Manager Green		
1: Set 2: Get	14	0~32	Gamma and Color: User2 Color Manager Blue		
1: Set 2: Get	15	0~32	Gamma and Color: User2 Color Manager Yellow		
1: Set 2: Get	16	0~127	Brightness		
1: Set 2: Get	17	0~127	Contrast		
1: Set 2: Get	18	-32~32	Aspect Ratio- UserDefine H-Zoom		
1: Set 2: Get	19	-32~32	Aspect Ratio- UserDefine V-Zoom		
1: Set 2: Get	20	-32~32	Aspect Ratio- UserDefine H-Pan		
1: Set 2: Get	21	-32~32	Aspect Ratio- UserDefine V-Pan		
1: Set 2: Get	22	0~255	Graphics Setting- H-Position		
1: Set 2: Get	23	0~255	Graphics Setting- V-Position		
1: Set 2: Get	24	0~127	Graphics Setting- Color		
1: Set 2: Get	25	0~127	Graphics Setting- Hue		
1: Set 2: Get	26	0~16	Graphics Setting- Sharpness		
1: Set 2: Get	27	0~100	Graphics Setting- Frequency		
1: Set 2: Get	28	0~31	Graphics Setting- Phase		

Control Type	Function	Param (for Set)	Function Description		Comment
1: Set 2: Get	29	0~127	Video Setting: Color		
1: Set 2: Get	30	0~127	Video Setting: Hue		
1: Set 2: Get	31	0~16	Video Setting: Sharpness		
1: Set 2: Get	32	0~20	Video Setting: H-Position		
1: Set 2: Get	33	0~20	Video V-Position for NTSC/NTSC 4.43/PAL-M/PAL 60		
		0~39	Video V-Position for PAL/PAL-N/SECAM/NTSC 4.43 50		
1: Set 2: Get	34	0~32	Audio Setting: Volume		
1: Set 2: Get	35	0~12	Audio Setting: Treble		
1: Set 2: Get	36	0~12	Audio Setting: Bass		
1: Set 2: Get	37	0~36	PIP Setting: H-Position		
1: Set 2: Get	38	0~36	PIP Setting: V-Position		
1: Set 2: Get	39	0~255	PIP Setting: User Define V-Size		
1: Set 2: Get	40	0~255	PIP Setting: User Define H-Size		
1: Set 2: Get	41	0~36	OSD Setting: H-Position		
1: Set 2: Get	42	0~36	OSD Setting: V-Position		
1: Set 2: Get	43	3~60	OSD Setting: OSD TimeOut		
3: Set 4: Get	0	0~9	Select Input Source	0: VGA-1 1: VGA-2 (CVG-724xl Only) 2: DVI 3: Component 4: YC-1 5: AV-1 6: YV-2 7: AV-2 8: Scart 9: TV	
3: Set 4: Get	1	0~5	Geometry: Video Aspect Ratio	0: Normal 1: Wide Screen 2: Pan&Scan 3: 4:3 4: 16:9 5: UserDefine	
3: Set 4: Get	2	0~3	Geometry: Video Nonlinear	0: Off 1: Side 2: Middle	

Control Type	Function	Param (for Set)	Function Description		Comment
3:Set 4:Get	3	0~5	Geometry: VGA Aspect Ratio	0: Full Screen 1: Native 2: NonLinear 3: 4:3 4: 16:9 5: UserDefine	
3: Set 4: Get	4	0~10	Zoom: Zoom Ratio	0: Off 1: 150% 2: 200% 3: 225% 4: 250% 5: 275% 6: 300% 7: 325% 8: 350% 9: 375% 10: 400%	
3: Set 4: Get	5	0~2	Graphics Setting: Color Format	0: Default 1: RGB 2: YUV	
3: Set 4: Get	6	0~2	Video Setting: Color Format	0: Default 1: RGB 2: YUV	
3: Set 4: Get	7	0~6	Video Setting: Video Standard	0: Video Standard - Auto 1: Video Standard - NTSC 2: Video Standard - NTSC 4.43 3: Video Standard - PAL 4: Video Standard - PAL-N 5: Video Standard - PAL-M 6: Video Standard - SECAM	
3: Set 4: Get	8	0~1	Video Setting: Film Mode	0: Off 1: On	
3: Set 4: Get	9	0~1	Audio Setting: Stereo	0: Off 1: On	
3: Set 4: Get	10	0~1	PIP Setting: PIP On/Off	0:Off, 1:On	
3: Set 4: Get	11	0~9	PIP Setting: PIP Source	0: VGA-1 1: VGA-2 (CVG-724xl Only) 2: DVI 3: Component 4: YC-1 5: AV-1 6: YV-2 7: AV-2 8: Scart 9: TV	
3: Set 4: Get	12	0~5	PIP Setting: PIP Size	0: 1/25 1: 1/16 2: 1/9 3: 1/4 4: Split 5: UserDefine	
3: Set 4: Get	13	0~1	PIP Setting: PIP Frame	0: Off 1: On	

Control Type	Function	Param (for Set)	Function Description		Comment
3: Set 4: Get	14	0~2	Seamless Switch: Mode	0: Fast 1: Moderate 2: Safe	
3: Set 4: Get	15	0~2	Seamless Switch: Background	0: Black 1: Blue	
3: Set 4: Get	16	0~2	Seamless Switch: Auto Search	0: Off 1: On	
3: Set 4: Get	17	0~1	OSD Setting: Startup Logo	0: Off 1: On	
3: Set 4: Get	18	0~1	OSD Setting: Size	0: Normal 1: Double	
3: Set 4: Get	19	0~1	OSD Setting: Source Prompt	0: Off 1: On	
3: Set 4: Get	20	0~1	OSD Setting: Blank Color	0: Blue 1: Black	
3: Set 4: Get	21	0~17	Output Resolution	0: 640x480 1: 800x600 2: 1024x768 3: 1280x1024 4: 1600x1200 5: 852x1024i 6: 1024x1024i 7: 1366x768 8: 1365x1024 9: 1280x720 10: 720x483 11: 852x480 12: 1400x1050 13: 480P 14: 720P 15: 1080i 16: 576p 17: 1080p 18: 1280x768 19: User Define	
3: Set 4: Get	22	0~3	Output Refresh Rate	0: 60Hz 1: 75Hz 2: 85Hz 3: 50Hz	
3: Set 4: Get	23	0~1	Factory Reset	0: Cancel, 1: ok	
3: Set 4: Get	24	0~3	Advanced: Input Buttom	0: Freeze/Blank 1: Freeze 2: Blank 3: Ignore	
3: Set 4: Get	25	0~1	Key Lock Save		
3: Set 4: Get	26	0~1	Input Lock		
3: Set 4: Get	27	0~1	SOG Setting	0: Auto 1: RGsB 2: HDTV	
5	0	N/A	Load Gamma/Color - Normal		
5	1	N/A	Load Gamma/Color - Presentation		

Control Type	Function	Param (for Set)	Function Description		Comment
5	2	N/A	Load Gamma/Color - Cinema		
5	3	N/A	Load Gamma/Color - Nature		
5	4	N/A	Load Gamma/Color - User1		
5	5	N/A	Load Gamma/Color - User2		
6: Set 7: Get	0	0~1	Power	0: Power Down 1: Power On	
6: Set 7: Get	1	0~1	Freeze	0: Off 1: On	
6: Set 7: Get	2	0~1	Blank	0: Off 1: On	
6: Set 7: Get	3	0~1	Mute	0: Off 1: On	
8	0	N/A	"Resolution/Refresh Rate" Or "Video Stand"		Example: "Y 8 0 CR" return: "Z 8 0 1080i CR"
1: Set 2: Get	44	> 100	HT, H-Sync Cycle	1. Setting Command should be a reasonable value 2. Getting Command return the current group parameter (refer to command "Y 3 29 X" or "Y 4 29 ")	Version 2.42 and above
1: Set 2: Get	45	> 0	HW, H-Sync Width		
1: Set 2: Get	46	> 0	HS, Active Pixel Start		
1: Set 2: Get	47	-	HA, Active Pixel		
1: Set 2: Get	44	> 100	HT, H-Sync Cycle		
1: Set 2: Get	45	> 0	HW, H-Sync Width		
1: Set 2: Get	46	> 0	HS, Active Pixel Start		
1: Set 2: Get	47	-	HA, Active Pixel		
1: Set 2: Get	44	> 100	HT, H-Sync Cycle		
1: Set 2: Get	45	> 0	HW, H-Sync Width		
1: Set 2: Get	54	> 100	OCLK	1. Oclk = Param / 10 Mhz 2. Should be a reasonable value	Version 2.42 and above
3: Set 4: Get	28	0~1	Enable OSD Timeout	0: Disable 1: Enable	Version 2.42 and above
3: Set 4: Get	29	0~2	Select Output Mode Userdefined Parameter Group	0: Group 1 1: Group 2 2: Group 3	Version 2.42 - Select which group of User Define Display Mode to be saved or loaded
3: Set 4: Get	30	0~2	Set the control way of Saving Audio Volume / Treble / Bass values	0: Master 1: Individual 2: Linked	Version 2.42 and above
6: Set 7: Get	4	0~1	Key Lock	0: Off 1: On	